



## Early Journal Content on JSTOR, Free to Anyone in the World

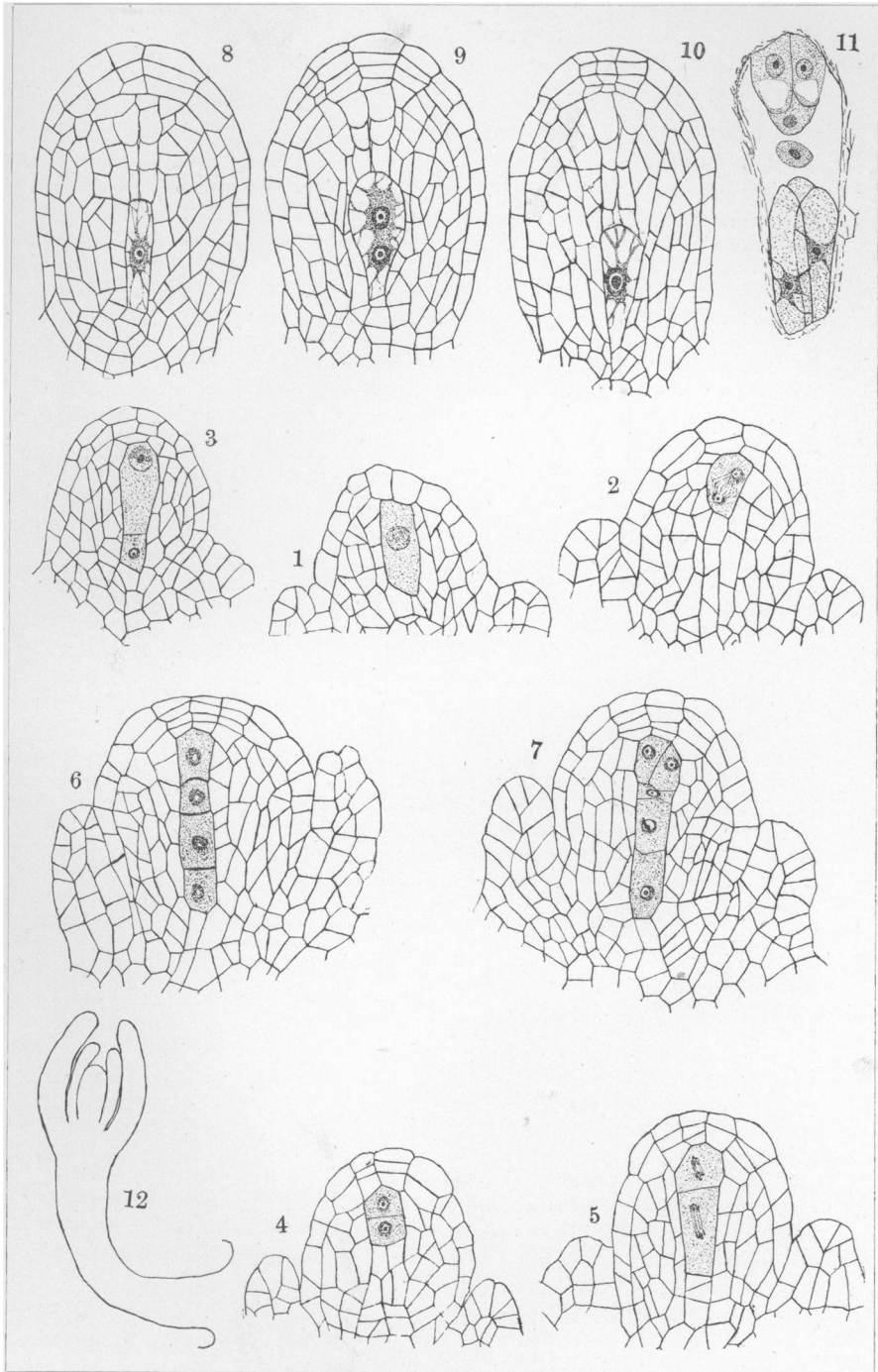
This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact [support@jstor.org](mailto:support@jstor.org).



ANDREWS on JEFFERSONIA.

## BRIEFER ARTICLES.

Development of the embryo-sac of *Jeffersonia diphylla*. (WITH PLATE XXVIII.)—*Jeffersonia diphylla* Pers. is a very favorable plant in which to study certain phases of embryology. This is due partly to its large cells and nuclei, and partly to the fact that its embryonic tissues are very readily stained and sectioned. Several stains were used, such as haematoxylin, fuchsin, and alum cochineal, with fair success, but for staining *in toto* alum cochineal proved most satisfactory. The sections were counter-stained on the slide with Bismarck-brown.

The mother-cell of the embryo-sac arises as an hypodermal cell at the apex of the nucellus. It contains but one nucleus and always stands with its long axis parallel to that of the nucellus (fig. 1). No tapetal cell is formed in this plant. In an ovule that has advanced somewhat in development we find that this mother-cell is preparing to divide into two similar cells by a transverse wall (figs. 2 and 4). This is indicated by the dividing nucleus (fig. 2).

In the next step toward maturity, it is noticed that the two cells just formed repeat in every detail (fig. 5) the process just described; so that there are now four cells resulting from two successive divisions of the mother-cell (fig. 6). Occasionally the uppermost of these four cells divides into two by an almost vertical wall (fig. 7). The transverse walls separating these four cells are somewhat swollen, and more distinct than the others (fig. 6). By repeated periclinal divisions of the epidermis of the nucellus, the row of four daughter cells is soon covered at its summit by four or more layers of cells (fig. 6). The number of these layers seems to increase quite uniformly with the age of the nucellus, though some exceptions were noted (figs 4, 5, 6).

In figure three (3) are shown two cells, the upper of which is much the larger. From my own observations it does not seem probable that the lower cell has arisen by division from the upper one, but that it is merely a cell of the axial row which did not divide but merely increased in size.

Of these four cells, which by successive divisions have arisen from the mother-cell, the lower one undergoes further development and becomes the embryo-sac. This cell increases in size at the expense of the three cells above it, together with the adjacent cells of the nucellus (fig. 10). The upper three cells are first absorbed and their cavities become almost obliterated by the surrounding turgid cells of the

nucellus (figs. 8, 9, 10). Their disorganized remains now occupy a narrow cavity above the enlarging embryo-sac.

The further development of the embryo-sac is perfectly normal. The primary nucleus soon divides (fig. 9), one of the resulting nuclei passing to the upper and the other to the lower end of the sac. Further details need not be given here.

In this plant the mature embryo-sac does not reach the integuments, but is covered at its summit by a cap of about six cells in thickness, formed from the tissue of the nucellus. The cavity of the embryo-sac when nearly matured is very large, and is often readily seen by the unaided eye in section. Both the antipodal cells and the egg-apparatus are also very large. Of the former especially is this true, for they occupy about half of the entire length of the sac containing them (fig. 11). Shortly before they are absorbed, however, the embryo-sac has enlarged greatly, so that this relation is not maintained. The nuclei of the antipodal cells are also very conspicuous, while even the protoplasmic bridges or threads are plainly visible (fig. 11).

In the lower end of the synergidæ and below the nucleus of each there is a vacuole (fig. 11). One is also to be seen in the upper end of the oosphere by focusing, but as this cell lies below and is partially covered by the synergidæ, it is obscured from view.

The ovules of this plant are anatropous, but in one instance observed, an ovule was borne on a very long stalk which arose at right angles to the surface of the placenta, then by a long curve extended upward in the cavity of the ovary to a height of the second ovule inserted above it (fig. 12).

The foregoing may be summarized as follows:

1. The embryo-sac arises as an hypodermal cell at the apex of the nucellus.
2. This cell divides first into two cells. Each of these cells again divides, thus forming four. The lower of these alone undergoes further development and becomes the embryo-sac.
3. The upper daughter-cell is occasionally divided into two by an almost vertical wall.
4. The antipodal cells are unusually large.

This work was carried on under the direction of Prof. D. M. Motier, who has very kindly supplied me with an abundance of properly preserved material.—FRANK M. ANDREWS, *Bloomington, Ind.*

EXPLANATION OF PLATE XXVIII.—Fig. 1. Longitudinal section of very young ovule showing hypodermal cell at apex of nucellus.—Fig. 2. Same, undergoing division.—Fig. 3. Division completed.—Fig. 5. Both cells again undergoing nuclear division.—Fig. 6. This is completed and walls formed.—Fig. 7. The upper of the four cells has divided into two by an almost vertical wall.—Figs.

8, 9 and 10. The first three steps in the development of the embryo-sac from the lower cell of the four shown in Fig. 7. Integuments are not shown.—Fig. 11. Outline only of embryo-sac with egg apparatus and very large antipodal cells.—Fig. 12. Ovule borne on a long stalk.  $\times 150$ . Figs. 1–11  $\times 420$ .

*Laphamia ciliata*, sp. nov.—Perennial, fruticose, 15–30<sup>cm</sup> high, with slender terete spreading branches, cinereous-pubescent throughout: leaves alternate or the lower sometimes opposite, deltoid or ovate, more or less punctate especially on the upper less pubescent green surface, somewhat decurrent on the petioles, these about half as long as the blades; lower leaves 10–15<sup>mm</sup> long and about as broad, crenate or irregularly dentate: upper leaves decreasing in size, narrower in proportion to their length and more deeply toothed: heads on slightly clavate pedicels 5–15<sup>mm</sup> long terminating the short upper branches, light-yellow, about 40-flowered, 5–7<sup>mm</sup> in diameter; involucre scales usually 12, equal, obscurely biseriate, oblanceolate, about 2<sup>mm</sup> wide near the apex, persistent, spreading or slightly reflexed at maturity: rays nearly white, crenately 3-toothed, 7-nerved, pistillate, about 3<sup>mm</sup> long and 2<sup>mm</sup> wide above the throat; disk flowers perfect, yellow, 4<sup>mm</sup> long including immature akene 2<sup>mm</sup> long; style branches exserted, recurved, 1<sup>mm</sup> long, minutely pubescent; akenes flattened, oblong, slightly curved, 2<sup>mm</sup> long, 0.5<sup>mm</sup> wide, black, with white callous ciliate margins; pappus a callous crown with 2 subequal hispidulous bristles 2<sup>mm</sup> long, from opposite margins.—Type specimen in National Herbarium collected by D. T. MacDougal, on rocks along Pine creek, near Pine, Arizona, August 21, 1891, no. 676. Cotype in National Herbarium, collected by J. W. Toumey, on Tucson mountains, near Tucson, Arizona, May 15, 1892, no. 629.

This species has the habit of *Laphamia rupestris* and agrees in all respects except the akene with the generic characters of *Laphamia*. The akene with its cartilaginous ciliate margin agrees with the characters of *Perityle*. The small many-flowered heads and the ciliate-margined akenes with a pappus of two slender bristles distinguish it from any similar species of *Laphamia*, while the fruticose much branched habit and nearly entire leaves distinguish it from any of the known species of *Perityle*.—LYSTER H. DEWEY, *Washington, D. C.*